

**IN THE UNITED STATES DISTRICT COURT
FOR THE EASTERN DISTRICT OF TEXAS
TYLER DIVISION**

**COMMONWEALTH SCIENTIFIC AND
INDUSTRIAL RESEARCH
ORGANISATION**

Plaintiff

vs.

**BUFFALO TECHNOLOGY (USA), a Delaware
corporation, and BUFFALO INC., a Japanese
corporation**

Defendant

**CASE NO. 6:06-CV-324
PATENT CASE**

MEMORANDUM OPINION AND ORDER

Before the Court are Defendants’ Motion for Summary Judgment of Invalidity (Docket No. 71), which the Court **DENIES**; Commonwealth Scientific and Industrial Research Organization’s (“CSIRO”) Cross-Motion for Summary Judgment of Validity (Docket No. 76), which the Court **GRANTS**; CSIRO’s Motion for Summary Judgment of Validity (Docket No. 120), which the Court **GRANTS**; Defendants’ Motion for Summary Judgment of Invalidity (Docket No. 126), which the Court **DENIES**; Defendants’ Motion for Summary Judgment of Non-Infringement (Docket No. 127), which the Court **DENIES**; and CSIRO’s Motion for Summary Judgment of Infringement (Docket No. 130), which the Court **GRANTS**.

Also before the Court are Buffalo’s Objections and Motions to Strike Cited Portions of CSIRO’s Evidence (Docket Nos. 81 and 90) and CSIRO’s Motion to Strike Bagby’s Declaration (Docket No. 159). In order to have the most complete summary judgment record, the Court **DENIES** these motions.

At the Pretrial Conference, the parties informed the Court that the majority of this case could be disposed of on cross-motions for summary judgment. Both sides filed cross-motions for summary judgment on infringement, invalidity based on prior art, and invalidity for lack of sufficient written description. CSIRO filed a motions for summary judgment on obviousness, but Buffalo did not file a cross-motion. The Court continued the trial setting and set the summary judgment motions for hearing. At the hearing, the parties stipulated that there are no triable fact issues on anticipation and if there are any factual issues relating to what has been briefed the Court should decide them.

BACKGROUND

The '069 Patent relates to a Wireless Local Area Network ("WLAN") having a network topology wherein each component, either a station or access point (hub), has a radio transceiver and antenna. Two or more station components can communicate in a peer-to-peer configuration. Also, multiple stations can communicate to an access point hub, which acts as a bridge to a wired network. The IEEE published a standard 802.11 for WLANs. The original 802.11 standard provided for data rates at up to 2 Mbps at 2.4 GHz using either Frequency Hopping Spread Spectrum ("FHSS") or Direct Sequence Spread Spectrum ("DSSS"). The 802.11a supplement provided for use of Orthogonal Frequency Division Multiplexing ("OFDM") to provide data rates to 54 Mbps in the 5 GHz U-NII bands. Both the 2.4 GHz and 5 GHz frequencies are in the Industrial Scientific and Medical ("ISM") bands, designated for use without the need for licensing by the Federal Communication Commission ("FCC"). The U-NII band has more spectra and allows room for 12 non-overlapping channels.

Radio frequency wave propagation characteristics must be considered in implementing a WLAN. Radio waves can be reflected by some materials such as walls, furniture, and other indoor

items, creating “multipath” where a radio signal is dispersed and arrives at the receiver from different paths. As a result, there can be multiple copies of the signal with different signal strengths. The problem that can result is called “intersymbol interference” (“ISI”), which is an overlap in arrival of the same symbol from different paths. ISI is the result of time differences between the arrivals of reflected copies of the same signal. This time difference is referred to as “delay spread.” As the data transmission speed gets faster, the time duration of the transmitted symbols (symbol period) gets smaller and more susceptible to ISI. In conventional radio transmission, the symbol period is set to be longer than the delay spread. Thus, multipath places an upper limit on data transmission rate. That is, as the delay spread increases, the symbol period must get longer, which in turn means that the data transmission rate necessarily decreases.

Radio transmission of information relies upon the concept of superimposing information on, or “modulating,” a carrier wave. In conventional radio transmission, the carrier is at a specific “narrowband” frequency. The receiver must be tuned to that same narrowband frequency to receive the transmission. If there are many transmissions occurring at the same time at the narrowband frequency, interference will result. In order to minimize interference, various techniques have been developed.

One technique to avoid interference from other transmission sources is to spread the signal over a wider range of frequencies. This is referred to as “spread spectrum.” A particular approach to the reduction of interference is FHSS, or Frequency Hopping Spread Spectrum, where the signal carrier is transmitted for a short period of time (“dwell time”) on one narrowband frequency and is then hopped to another narrowband frequency. A WLAN that uses FHSS to reduce interference with other devices operates on a predetermined hopping sequence that is known to the receiver and can

be followed by it. The dwell time, however, must be consistent with the delay spread to avoid ISI. Thus, FHSS is a wideband modulation scheme that uses multiple carriers one at a time and avoids interference with other transmission signals in the same band by hopping over many different frequencies. During any one hop, the FHSS signal appears to be a narrowband signal.

Another technique is to use multiple carriers simultaneously rather than one at a time. This is technically not a spread spectrum because the carriers remain stationary and are not moved, but it serves the same purpose of spreading the signal power over a large band. This is known as Orthogonal Frequency Division Multiplexing (“OFDM”) or Multicarrier Modulation (“MCM”). The data is broken into subparts and each subpart is simultaneously transmitted on a different carrier frequency. Again, the transmission period of each part (channel symbol length) must be consistent with the delay spread to avoid ISI. Because there is simultaneous transmission of all the signal parts, the data transmission rate is higher than with FHSS.

In addition to various modulation schemes for RF transmission of data, an important aspect of WLAN data transmission is the addition of data reliability enhancement afforded by using coding of the actual data prior to its conversion to a modulated transmission signal. Forward Error Correction (“FEC”) coding is one type of digital signal processing that improves data reliability by introducing a known structure into a data sequence prior to transmission. This structure allows a receiver to detect and possibly correct errors caused by corruption from the channel without requesting re-transmission of the original information. In a system that employs FEC, a digital information source sends a data sequence to an encoder. The encoder inserts redundant bits, thereby outputting a longer sequence of code output bits as a “codeword.” One type of FEC is known as “convolutional coding.” The incoming data is in a stream of bits. A Rate $\frac{1}{2}$ convolutional encoder

provides two data “di-bits” for every input bit.

Additional protection to data corruption due to adjacent burst errors is data “interleaving,” which spreads data over a variable period of time. With data interleaving, data is transmitted by spacing the content of consecutive data packets. Interleaving is used in conjunction with FEC. Burst errors are distributed over many data packets and the FEC has fewer errors to correct in each packet. Data interleaving works by shuffling the data.

INVALIDITY: ANTICIPATION

Applicable Law

A patent is entitled to a presumption of validity, and an accused infringer must prove invalidity by clear and convincing evidence. *Metabolite Labs., Inc. v. Lab. Corp.*, 370 F.3d 1354, 1365 (Fed. Cir. 2004).

A person shall be entitled to a patent unless—

(a) the invention was known or used by others in this country . . . before the invention thereof by the applicant for patent, or

(b) the invention was . . . in public use or on sale in this country, more than one year prior to the date of the application for patent in the United States, or

....

(g) . . . (2) before such person’s invention thereof, the invention was made in this country by another inventor who had not abandoned, suppressed, or concealed it. In determining priority of invention under this subsection, there shall be considered not only the respective dates of conception and reduction to practice of the invention, but also the reasonable diligence of one who was first to conceive and last to reduce to practice, from a time prior to conception by the other.

35 U.S.C. § 102. To invalidate patent claims based on prior art, the challenger to the patent must show by clear and convincing evidence that the earlier invention is prior art under section 102 and the earlier invention includes all elements of the claims at issue. *Metabolite Labs.*, 370 F.3d at 1365, 1367; *Netscape Commc’ns Corp. v. Konrad*, 295 F.3d 1315, 1320 (Fed. Cir. 2002). For prior art to

anticipate a patent under section 102(a), the knowledge must be publicly known and sufficient to enable one of ordinary skill in the art to practice the invention. *Minnesota Mining & Mfg. Co. v. Chemque, Inc.*, 303 F.3d 1294, 1301 (Fed. Cir. 2002). For prior art to anticipate because it was used, the use must be accessible to the public. *Id.*

To be invalid under section 102(g), another must have actually reduced the invention to practice or constructively reduced the invention to practice by filing a patent application. *In re Katz*, 687 F.2d 450, 454 (C.C.P.A. 1982). Reduction to practice requires that the invention be sufficiently tested to show that it will work for its intended purpose. *Kimberly-Clark Corp. v. Johnson & Johnson*, 745 F.2d 1437, 1445 (Fed. Cir. 1984). ““When the invention has not quite passed beyond experiment and has not quite attained certainty and has fallen short of demonstrating the capacity of the invention to produce the desired result, the invention itself is still inchoate.”” *Id.* (quoting 1 *Deller's Walker on Patents*, § 46 at 202 (2d ed. 1964)). Whether a prior art reference anticipates a patent is a factual determination that is reviewed for substantial evidence. *Metabolite Labs.*, 370 F.3d at 1359.

“To anticipate, every element and limitation of the claimed invention must be found in a single prior art reference, arranged as in the claim.” *Brown v. 3M*, 265 F.3d 1349, 1351 (Fed. Cir. 2001); see *Karsten Mfg. Corp. v. Cleveland Golf Co.*, 242 F.3d 1376, 1383 (Fed. Cir. 2001). Anticipation is a question of fact. *Apple Computer, Inc. v. Articulate Sys., Inc.*, 234 F.3d 14, 20 (Fed. Cir. 2000). By statute, a patent is presumed to be valid. 35 U.S.C. § 282.

Analysis

1. Wilkinson Publication

A. Incorporation of Bingham

Buffalo's expert, Bagby, concludes in his report that Wilkinson and Bingham anticipate claims 10-16, 26-32, 56-60, and 68-72. This conclusion depends on the assumption that Wilkinson incorporates the Bingham publication by reference. Thus, the Court must first determine whether and to what extent Wilkinson incorporates Bingham. This is a question of law. *Advanced Display Sys., Inc. v. Kent State Univ.*, 121 F.3d 1272, 1283 (Fed. Cir. 2000).

Proper incorporation by reference requires citing material in such "a manner that makes clear that the material is effectively part of the host document as if it were explicitly contained therein." *Id.* at 1282. The host document, Wilkinson, must identify with particularity what specific material from the reference document, Bingham, it incorporates and clearly indicate where that material is found in Bingham. *See id.*

The Wilkinson publication references the Bingham publication in a footnote. *See* Wilkinson at 6/4, n.7. Wilkinson gives no specific discussion of Bingham's contents. Wilkinson merely cites to Bingham to identify possible techniques for achieving increased information rates in the context of using parallel carrier frequencies simultaneously rather than hopping between parallel frequencies. The specific reference in Wilkinson is a general statement in regard to OFDM.

Bingham is directed to MCM, which has also been called OFDM. This is illustrated in Fig. 1 of Bingham as a "Basic Multicarrier Transmitter." Bingham states that his article includes nine different sections of discussion relating to MCM. In one section, Bingham discusses early MCM and conventional FDM technology using filters to produce the modulation carriers for transmission

of sub-bands of a multicarrier system as shown. *See* Bingham at 5 & Fig. 2. In a later section, Bingham discusses the use of Inverse FFT as an equivalent to the use of filters in producing modulation carriers for the sub-bands of a multicarrier system. *See* Bingham at 8.

There is no particular identification in Wilkinson as to the aspect of Bingham that is being referenced as COFDM. The cite in Wilkinson to Bingham is such that it is merely an invitation to the reader to learn more about MCM techniques for obtaining increased information rates. Therefore, the Wilkinson publication does not meet the legal standard for incorporation by reference as to the Bingham publication.

B. Anticipation by Wilkinson

In opposition to CSIRO's motion for summary judgment that the claims of the '069 patent are not invalid, Buffalo submits the Declaration of David Bagby, which contains an anticipation analysis for Wilkinson that relies upon the Bagby Report. The Bagby Report opines that Wilkinson has each of the limitations of each of the claims 10-16, 26-32, 42-48, 56-60, and 68-72. According to the Bagby Report, the modulation means limitation in Wilkinson is provided by virtue of its citation to Bingham. However, since Bingham is not part of the Wilkinson disclosure, the Bagby Report's finding that the modulation means is present in Wilkinson is without basis. Consequently, Buffalo's evidence of anticipation based on Wilkinson is insufficient.

Even if Wilkinson had incorporated Bingham, the Bagby Report provides only conclusory assertions as evidence. For example, as to claim 10, the Bagby Report gives a graphical representation of the limitations of claim 10, which depicts the modulation means as 10(i) in Fig. 7. In regard to the modulation means, the Bagby Report only characterizes the function as "multiple sub-channel modulation" and adds "which is simply OFDM with the symbol length chosen

appropriately for the amount of delay spread expected within the anticipated usage environment.” *See* Bagby Report at 24-25. While this may be an acceptable paraphrasing of the claim language that specifies the function of the modulation means, the Bagby Report only provides the conclusion that “Wilkinson discloses this modulation.” Nowhere does the Bagby Report identify where “this modulation” is disclosed in Bingham or explain the basis for that conclusion.

Later at page 58, the Bagby Report again makes the conclusory statement that “Wilkinson and Bingham discloses the use of COFDM which is an ensemble modulation technique.” A reference is made to section 4.2.5 of the Bagby Report, which merely states, “Among the modulation techniques discussed, Wilkinson described ways to ‘combat severe multi-path’ with the use of OFDM to ‘achieve increased information rates’ in the presence of ‘delay spread in the environment’ for ‘indoor radio propagation.’” Again, there is no identification as to where this is disclosed in Wilkinson or any explanation as to the basis for that conclusion.

Moreover, the paraphrasing in the Bagby Report does not fully meet the claim limitation, as construed, which requires the IFFT-based modulator 47 or an equivalent thereof. Absent is any analysis identifying anything in particular in Wilkinson or Bingham as an IFFT-based modulator. The Bagby Report does offer that “OFDM inherently discloses the use of IFFT/FFT algorithms.” But, again, only a conclusory statement is made and absent in the Bagby Report is any explanation for it other than reference to unidentified systems that Dr. Bagby says, “I have seen” and an assertion that one skilled in the art would have known that economically viable implementations of OFDM would have utilized digital logic to perform IFFT/FFT algorithm calculations. Thus, the Bagby Report finds inherent disclosure of an IFFT-based modulator based only upon the mere mention of OFDM and the opinion that the knowledge of one skilled in the art is that OFDM can be

implemented using IFFT digital logic. However, the knowledge of those of ordinary skill in the art does not necessarily equate to inherency. *Atlas Powder Co. v. Ireco, Inc.*, 190 F.3d 1342, 1347 (Fed. Cir. 1999). Furthermore, the Bagby Report does not account for Bingham's characterization of an MCM (i.e., OFDM) modem implemented using filters rather than digital logic performing IFFT calculations. Thus, the Bagby Report does not show that a person of ordinary skill in the art following Wilkinson and Bingham would necessarily implement OFDM using digital logic performing IFFT calculations. Inherency cannot be established by probabilities or possibilities. The possibility of implementing OFDM using digital logic performing IFFT calculations is not legally sufficient to show anticipation. *Mehl/Biophile Int'l Corp. v. Milgraum*, 192 F.3d 1362, 1365 (Fed. Cir. 1999).

In any event, the Bagby Report provides no detailed analysis as to the presence of an identical functional, structural identity, or structural equivalency in Wilkinson for the modulation means, even with Bingham included. Buffalo is required to designate specific facts showing that there is a genuine issue for trial. Specifically, Buffalo has the burden of demonstrating that there are genuine issues as to whether Wilkinson discloses a device that performs the identical function of the modulation means using structure that is the same as or equivalent to the IFFT-based modulator 47.¹ Particularly in view of the clear and convincing evidentiary standard that is to be applied, such generalized testimony and unsupported conclusions on the ultimate issue as to the presence of a claim limitation in a prior art disclosure will not suffice to raise a genuine issue of material fact.

¹ The Bagby Report provides similar conclusory statements in regard to the presence of the data reliability enhancement means, and the interleaving means.

Arthur A. Collins Inc. v. N. Telecom Ltd., 216 F.3d 1042, 1046-48 (Fed. Cir. 2000).²

In support of its motion for summary judgment that the claims of the '069 patent are not invalid, CSIRO submitted the declaration of Dr. Peter Monsen (Docket No. 125). At pages 25-30, Dr. Monsen provides a prior art summary. In the summary, there is admission that Wilkinson contains the limitations in claims 10, 26, 42, 56 and 68 other than the modulation means, the data reliability enhancement means, and the interleaving means.³

Turning to a comparison of these claim limitations with Wilkinson, the function of the modulation means is “modulating input data of said input data channel into a plurality of sub-channels comprised of a sequence of data symbols such that the period of a sub-channel symbol is longer than a predetermined period representative of the time delay of significant ones of non-direct transmission paths.” Wilkinson discloses the use of FHSS and OFDM for modulation to address time dispersion in a multi-path indoor radio propagation channel that leads to ISI. Wilkinson at 6/1. Both techniques involve the use of multiple carrier frequencies. The FHSS approach decreases interference with other transmission sources at the same frequency by switching transmission between multiple adjacent carrier frequencies such that the multiple carriers are used one at a time. The OFDM multi-tone approach also decreases interference by transmitting data on multiple adjacent carrier frequencies rather than on a single frequency.⁴ As in conventional radio transmission at a single frequency, OFDM has symbol durations that are long relative to the multi-path dispersion

² Buffalo agreed at the hearing conducted on August 14, 2006, that the application of a means-plus-function claim limitation for purposes of establishing anticipation is the same as that of establishing literal infringement.

³ Based upon the parties' agreed construction of “transmission signal processing means,” method claim 68 includes the same means-plus-function constructions for the modulation means, the data reliability enhancement means, and the interleaving means that obtain for the apparatus claims.

⁴ Levesque Declaration (Docket No. 124) at 10.

time.⁵ As explained in Wilkinson, in FHSS, the frequency hop bandwidth is less than the coherence bandwidth in the environment.⁶ Thus, the transmitted information on a particular frequency will not be corrupted by ISI. Wilkinson at 6/2. Thus, the channel symbol length in FHSS is chosen to be smaller than the multi-path spread. As further explained in Wilkinson, because FHSS has only a single sub-channel carrier active at any point in time, the information rate is limited; and it is advantageous to use multiple carriers simultaneously (i.e., OFDM) to obtain a higher information data rate. Otherwise, as the information rate is increased, the symbol rate (i.e., frequency hop bandwidth) becomes greater than the coherence bandwidth and ISI is encountered.⁷

Thus, both FHSS and OFDM perform the specified function of the modulation means.⁸ However, absent from Wilkinson is any disclosure of a modulator structure. Accordingly, absent from Wilkinson is disclosure of the modulation means limitation of the claims.

FEC is a form of data reliability enhancement (“DRE”). Wilkinson discloses FEC coding. Thus, the function of the DRE means is disclosed in Wilkinson. However, absent from Wilkinson is any disclosure of a structure for performing the function.

Finally, Wilkinson discloses the use of interleaving. Accordingly, the function of the

⁵ *Id.*

⁶ This refers to the dwell time on each sub-channel carrier and defines the symbol duration. It must be longer than the multi-path spread (i.e., time delay) of the channel, which defines the coherence bandwidth of the channel.

⁷ See Monsen Declaration (Docket No. 125) at 22. Monsen’s statement that “longer than a predetermined period” does not happen in an FHSS is in the context of a high data rate that results in a short modulation symbol that is vulnerable to multi-path. However, the claims do not specify any information data rate or multi-path dispersion time. See also, ‘069 patent at cols. 8:38-49, 2:6-11. CSIRO’s tutorial at 22 indicates that in FHSS, the data rate is limited by the need to keep the symbol period long while carrying only one symbol at a time over the frequency band.

⁸ It is to be noted that, while FHSS does not use a plurality of carriers simultaneously whereas in OFDM a plurality of carriers simultaneously exist, the claim language does not specify that the sub-channels must exist simultaneously. OFDM is technically not spread spectrum because the sub-carriers remain stationary and are not spread, but it serves the same purpose as FHSS of spreading the signal power over a large band.

interleaving means is disclosed in Wilkinson, but absent from Wilkinson is any disclosure of a structure for performing the function.

Absent from Wilkinson are structures which are capable of performing the functions of the recited modulation means, DRE means, and interleaving means.⁹ Accordingly, the Court concludes that that Buffalo has failed to demonstrate by clear and convincing evidence that Wilkinson anticipates any of claims 10-16, 26-32, 42-48, 56-60, and 68-72.

2. The Rault Publication

CSIRO admits that Rault has the modulation means, DRE means, and interleaving means of the claims. As to independent claims 42, 56 and 68, CSIRO contends that only the limitation “in a confined multipath transmission environment” is absent from Rault.¹⁰ The term has been construed to mean “an indoor environment.” CSIRO argues that Rault discloses a transmitter that is for operation in an outdoor environment. Buffalo’s position is that “the *techniques* disclosed in Rault necessarily operate in both the indoor and outdoor environment” and that “Rault inherently discloses indoor environments.” Buffalo relies upon the Bagby Report. *See* Buffalo’s Response (Docket No. 147) at 12-14.

From a review of the prosecution history, the basis for allowance was the limitation to radio

⁹ There does not appear to be a dispute that Wilkinson discloses the functional combination of FEC, interleaving, and FHSS in a WLAN. The record also contains Saleh (U.S. Patent No. 5,048,057), which similarly discloses an encoder 13 (DRE means), interleaver 16 (interleaving means), and FHSS modulator 21. *See* Monsen Declaration (Docket No. 125) at 27. The ‘069 patent indicates that OFDM is interchangeable with FHSS in the absence of specified information data rate and transmission path time delay. *See* cols. 2:6-11, 8:38-42. *See also*, Monsen Declaration at 21-22; and Wilkinson at 6/2. A factor that will support a conclusion that the prior art element is a § 112, ¶6, equivalent is that a person of ordinary skill in the art would have recognized the interchangeability of the element shown in the prior art for the corresponding structure disclosed in the specification. *See Chiuminatta Concrete Concepts, Inc. v. Cardinal Indus., Inc.*, 145 F.3d 1303, 1309 (Fed. Cir. 1998). However, Buffalo specifically agreed at the hearing that Saleh is not relied upon for anticipation and that an FHSS modulator and an OFDM modulator are not equivalent structures.

¹⁰ *See* Monsen Declaration (Docket No. 125) at 26-30.

transmission operation in an indoor environment. Neither of the references, Schuchman et. al. (U.S. Patent No. 5,283,780) and Smith (U.S. Patent No. 4,630,314), described radio transmissions in an indoor environment.¹¹

The Declaration of David Bagby submitted in opposition to CSIRO's motion for summary judgment relies upon the Bagby Report, which provides a conclusory overview analysis of the Rault publication and offers only conclusions in regard to anticipation by Rault. *See* Bagby Report at 47-53. The Bagby Declaration in paragraph 16 merely observes that multipath is an inherent aspect of radio signal propagation for both indoor and outdoor environments; and it cites to disclosures in Rault that concern only an outdoor environment. In fact, the basis for Buffalo's argument that an indoor environment is inherently disclosed in Rault rests solely on the fact that multi-path dispersion occurs both indoors and outdoors.

First, the conclusory statements of the Bagby Declaration and the Bagby Report will not suffice to raise a genuine issue of material fact. Second, nowhere does Buffalo identify where there is an express disclosure in Rault of apparatus that is operable indoors. The inherency argument also fails. There is no evidence in the record that a person of ordinary skill in the art following Rault would necessarily implement apparatus for operation in an indoor environment. Inherency cannot be established by probabilities or possibilities. The possibility of implementing Rault for operation indoors is not legally sufficient to show anticipation.

Accordingly, the Court concludes that Buffalo has failed to demonstrate by clear and convincing evidence that Rault anticipates any of claims at issue.

¹¹ Both Smith and Schuchman were characterized as not disclosing a sub-channel period longer than a multi-path time delay. *See* Amendment of Feb. 7, 1995, at 27. However, the '780 Schuchman discusses environmental delay spread (col. 3:12-30) and the use of frequency hopping at a period longer than the delay spread (col. 4:30-33).

INVALIDITY: OBVIOUSNESS

Applicable Law

A claimed invention is unpatentable if the differences between it and the prior art “are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art.” 35 U.S.C. § 103(a); *see Graham v. John Deere Co.*, 383 U.S. 1, 14 (1966). The ultimate determination of whether an invention is or is not obvious is a legal conclusion based on underlying factual inquiries including: (1) the scope and content of the prior art; (2) the level of ordinary skill in the prior art; (3) the differences between the claimed invention and the prior art; and (4) objective evidence of nonobviousness. *See Graham*, 383 U.S. at 17-18. An essential evidentiary component of an obviousness showing is a teaching or suggestion or motivation to combine the references. Moreover, the obviousness of a patent claim must be established by clear and convincing evidence. *C.R. Bard, Inc. v. M3 Sys., Inc.*, 157 F.3d 1340, 1351 (Fed. Cir. 1998).

Analysis

Buffalo relies upon the Bagby Declaration, which references the Bagby Report, in opposition to CSIRO’s motion that the claims of the ‘069 patent are not invalid for obviousness. The Bagby Report advances several different combinations of prior art references in support of a conclusion that the claims of the ‘069 patent would have been obvious. These combinations include: Fattouche and Rault; Fattouche and Cimini; Budin and Rault; and Wilkinson or Fattouche in combination with any of Cimini, Rault, Budin and/or Saleh. *See Bagby Report* at 94-100.

1. Fattouche and Rault

The Bagby Report gives only conclusions that Fattouche and Rault disclose all of the elements of each of the claims and that all of the claims are obvious. *Bagby Report* at 94-96. There

is no delineation as to what elements of the claims are absent from any particular one of the references that are supplied by the other reference in the combination of Fattouche and Rault.

The Monsen Declaration states that Fattouche does not disclose the DRE means. Monsen Declaration at 14. The Bagby Declaration agrees. Bagby Declaration at 4, ¶13. As previously discussed, CSIRO admits that Rault has the modulation means, DRE means, and interleaving means of the claims. But, the limitation “in a confined multipath transmission environment” is not met by Rault. CSIRO admits that Fattouche does disclose a system for use indoors.

2. Fattouche and Cimini

Turning to the combination of Fattouche and Cimini, the analysis advanced by Buffalo with regard to that combination is no more exhaustive than was provided for Fattouche and Rault. Again, Buffalo relies upon the Bagby Declaration, which references the Bagby Report. The Bagby Report gives only the same conclusions that Fattouche and Cimini together disclose all of the elements of each of the claims and that all of the claims are obvious. Bagby Report at 96-98. Once again, there is no delineation as to what elements of the claims are absent from any particular one of the references that are supplied by the other reference in the combination of Fattouche and Cimini.

In regard to Cimini, the Monsen Declaration states that Cimini does not include interleaving. The Bagby Declaration does not discuss Cimini, but the Bagby Report indicates agreement that Cimini does not include an interleaver means (e.g., element 10[k]). *See* Bagby Report at 90. The Bagby Report only indicates that Fattouche shows an interleaver as part of a prior art arrangement. *See* Bagby Report at 11. The Bagby Declaration at page 4, paragraph 12, appears to attempt to dispute the Monsen Declaration. But, the declaration is only that Fattouche discloses that the use of interleaving is common in the prior art to Fattouche. CSIRO admits that Cimini has the

modulation means and DRE means; but, CSIRO contends that the limitation “in a confined multipath transmission environment” is not met by Cimini. CSIRO, as stated above, admits that Fattouche does disclose a system for use indoors.

3. Budin and Rault

The evidence submitted by Buffalo based on the combination of Budin and Rault mirrors that of the combination of Fattouche and Rault. But, whereas Fattouche expressly disclosed use of OFDM to implement wideband modulation, Budin uses Direct Sequence Spread Spectrum (“DSSS”). Once again, Buffalo relies upon the Bagby Report, which merely gives conclusions that Budin and Rault together disclose all of the elements of each of the claims and that all of the claims are obvious without specifying what elements of the claims are absent from any particular one of the references that are supplied by the other reference in the combination. *See* Bagby Report at 98-100.

4. Wilkinson or Fattouche in combination with any of Cimini, Rault, Budin and/or Saleh

The analysis of the combination of Wilkinson or Fattouche and any of Cimini, Rault, Budin and/or Saleh is even more cursory. *See* Bagby Report at 100.¹² In support of a motivation for one skilled in the art to combine the various combinations of references, Buffalo relies upon the Bagby Declaration and the Bagby Report. In the Bagby Declaration, the evidence of motivation is that of a common desire of the references to deal with multipath propagation effects. In addition, there is only the reliance on the Bagby Report that it would be natural for one skilled in the art to combine the references because IEEE publications and United States Patents are primary sources of technical information. *See* Bagby Declaration at 6-7. There is an important distinction, however, between the

¹² As pointed out previously in n.9, CSIRO admits that Saleh has all the claim elements except for the modulation means. Saleh uses FHSS for wideband modulation rather than OFDM. The record is without any obviousness analysis with regard to Saleh as the primary reference.

general motivation to address a problem and the motivation to create a particular solution to the problem. *Cardiac Pacemakers, Inc. v. St. Jude Med., Inc.*, 381 F.3d 1371, 1377 (Fed. Cir. 2004).

First, the Court concludes that the conclusory statements in the Bagby Declaration and the Bagby Report do not raise a genuine issue of material fact as to any of the factual inquiries specified by *Graham*. Second, Buffalo has not proffered specific evidence as to the source of a teaching, suggestion, or motivation to combine the prior art references. Buffalo has simply stated that multipath is common in indoor and outdoor radio communications and that persons skilled in the art naturally consider patents and IEEE publications in seeking technical information. Absent, however, is identification of any specific evidence in the combinations of references (or anywhere else in the record) that suggests combining them in a manner that results in the claimed subject matter. An identification of similarities between the references and that the references together describe all the limitations of the claims is insufficient to meet the burden of demonstrating obviousness by clear and convincing evidence.¹³ Buffalo has not, as a matter of law, carried its burden of making a prima facie case that the claims of the '069 patent are invalid for obviousness based on any combination of the prior art set forth in the Bagby Declaration and Bagby Report.

INVALIDITY: WRITTEN DESCRIPTION REQUIREMENT

As one of its invalidity defenses, Buffalo contends that the asserted claims (10-16, 26-32, 42-48, 56-60 and 68-72) of the '069 patent are invalid because the specification of the originally-filed application for the '069 patent does not contain a written description of the invention set forth in the

¹³ Wilkinson would seem to suggest to one skilled in the art that OFDM can be used in substitution for FHSS (i.e., in the arrangement disclosed in Saleh) to obtain increased information rates in a WLAN, but the record does not contain any evidence to that effect.

asserted claims as required by §112, ¶ 1.¹⁴ In other words, Buffalo argues the asserted claims are invalid because their scope is unsupported by the written description in the original application. *Cooper Cameron Corp. v. Kvaerner Oilfield Prods., Inc.*, 291 F.3d 1317, 1323 (Fed. Cir. 2002) (a broadly drafted claim must be fully supported by the written description and drawings). Buffalo and CSIRO have both moved for summary judgment on this issue.

Applicable Law

One purpose of the written description requirement is to prevent an applicant from later asserting that he invented that which he did not. *Amgen Inc. v. Hoechst Marion Roussel, Inc.*, 314 F.3d 1313, 1330 (Fed. Cir. 2003). However, the test is not the presence or absence of literal support. *See Ralston Purina Co. v. Far-Mar-Co., Inc.*, 772 F.2d 1570, 1575-76 (Fed. Cir. 1985). In order to satisfy the written description requirement, the disclosure of the application for the '069 patent must reasonably convey to one skilled in the art that the inventors were in possession of the claimed subject matter to the extent of the scope of the asserted claims. *Vas-Cath Inc. v. Mahurkar*, 935 F.2d 1555, 1563-64 (Fed. Cir. 1991).

Although the application must show the inventor was in possession of the claimed invention, “a claim may be broader than the specific embodiment disclosed in a specification.” *In re Rasmussen*, 650 F.2d 1212, 1215 (C.C.P.A. 1981). Further, a specification may contain an adequate written description of a broadly claimed invention without describing all species that the claim encompasses. *Ralston Purina*, 772 F.2d at 1575.

“Compliance with the written description requirement is essentially a fact-based inquiry that

¹⁴ Buffalo does not contend in its motion that the written description fails to adequately describe the claimed invention aside from the “in excess of 10 GHz” issue, although at the claim construction stage of the proceedings, Buffalo did allege that there was no disclosure of corresponding structure for the means-plus-function limitations of the asserted claims. The Court dispatched this argument in its claim construction order.

will ‘necessarily vary depending on the nature of the invention claimed.’” *Enzo Biochem v. Gen-Probe, Inc.*, 323 F.3d 956, 963 (Fed. Cir. 2002) (citation omitted). Determining whether a priority application contains sufficient disclosure under §112 is a question of law; but compliance with the written description aspect of that requirement is a question of fact. *Waldemar Link v. Osteonics Corp.*, 32 F.3d 556, 558 (Fed. Cir. 1994).

Analysis

Buffalo specifically argues that the originally-filed application does not support the limitation of “radio frequencies” to the full range of 3 KHz to 300 GHz. Buffalo contends that the specification does not reasonably convey to one skilled in the art that the inventors were in possession of a system in accordance with their invention that would operate at radio frequencies other than those in excess of 10GHz.¹⁵

Much of the parties’ briefing has been in connection with a dispute as to whether the changes to the specification made in the 1995 Amendment constituted “new matter.”¹⁶ There is no dispute, however, that if the Australian application reasonably conveys to one skilled in the art that the

¹⁵ Buffalo contends that support for the asserted claims is only present in alleged “new matter” that was added to the specification both upon the filing of the application in the United States Patent and Trademark Office and upon the filing of the July 3, 1995 amendment, which also broadened the claims from “said radio transmissions have a frequency in excess of 10 GHz” to “transmit and receive data at radio frequencies.” Broadening a claim does not add new matter since an applicant is entitled to claim as broadly as the prior art and his disclosure will allow. Moreover, although the prohibition against new matter during patent prosecution under §132 is closely related to the requirement that the specification provide adequate support for the claims under §112, first paragraph, *see Chemcast Corp. v. Arco Indus. Corp.*, 913 F.2d 923, 926-27 (Fed. Cir. 1990), a determination of the validity of the asserted claims of the ’069 patent under §112, first paragraph, does not require an analysis of that specific issue. *In re Rasmussen*, 650 F.2d at 1212-16. Further, while new matter and written description issues can have implications with regard to whether an application is entitled to the filing date of an earlier application under §120, the parties have not raised the issue as a matter of priority for purposes of establishing a filing date in relation to prior art.

¹⁶ The record is clear that the claims of the initially filed U.S. application were subsequently broadened and the specification amended in the 1995 Amendment. The parties have focused exclusively on the propriety of the applicants doing so in terms of §132. No issue has been presented, however, with regard to compliance with 35 U.S.C. §115 or whether a supplemental oath was required.

inventors were in possession of subject matter to the extent of the scope of the asserted claims, then the applicants were entitled to obtain the asserted claims, and the asserted claims are not invalid under §112, first paragraph.

Buffalo first argues that the Australian application only claimed operation at a frequency in excess of 10 GHz and broadening the claim scope by removing the “in excess of 10 GHz” limitation was an afterthought motivated by changes in FCC regulations, which permitted unlicensed devices operating in the 2.4 GHz band. However, there is nothing improper about amending claims during prosecution for the purpose of obtaining a broader right to exclude based upon knowledge obtained after filing the application. *Liebel-Flarsheim Co. v. Medrad, Inc.*, 358 F.3d 898, 909 (Fed. Cir. 2004).

Relying on the inventors’ testimony, Buffalo argues that in trying to develop a WLAN that would have a data rate of 100 Mbps the inventors only considered their invention feasible when operating at a frequency in excess of 10 GHz. As pointed out by CSIRO, the claimed invention in the Australian application did not specify any minimum data transmission rate. CSIRO Opposition Br. at 24. Further, the inventors’ testimony is clear that they were only attempting to identify an area of the radio frequency spectrum where there was sufficient bandwidth available for the higher data rates sought.¹⁷ The inventors’ testimony does not compel a conclusion that they were in possession of an invention that only worked at frequencies in excess of 10 GHz.

Buffalo also argues that the disclosure in the Australian application was expressly limited to

¹⁷ In a 1992 publication by the inventors, they state: “None of the bands below 60 GHz has more than 100 MHz available and are in congested part of the spectrum where expansion is not possible. Therefore, these are not likely candidates for use in a high-speed WLAN system. The best option for radio transmission appears to be 60 GHz.” See Exhibit G to the Gardner Declaration at 60. This testimony is completely unlike the inventor’s testimony in *Gentry Gallery, Inc. v. Berkline Corp.*, 134 F.3d 1473 (Fed. Cir. 1998), where the inventor admitted that he had not even considered the more broadly claimed subject matter until he became aware that others were doing it.

an invention wherein operation was at a frequency in excess of 10 GHz and one skilled in the art would conclude that the invention required the transmission of data at frequencies in excess of 10 GHz. In support, Buffalo points to the statement in the Australian application that “[f]or radio transmission at a frequency in excess of 10 GHz, a multipath mode of transmission from the transmitter 3 to receiver 4 occurs.” Buffalo’s Br. at 6-7.¹⁸ Buffalo also relies upon the Bagby Declaration filed November 18, 2005, at ¶7. Bagby’s Declaration testimony, however, does not even mention the Australian application. Moreover, Bagby’s Declaration does not support Buffalo’s statement that “one skilled in the art reading the application would unquestionably conclude that the invention required the transmission of data frequencies in excess of 10 Ghz.” Buffalo Br. at 7. In fact, all the Bagby Declaration states is that one skilled in the art would understand that a change was made in the application that significantly broadened the scope of the ‘069 patent. The Bagby Declaration does not address the question as to what the statement in the Australian application would mean to one skilled in the art in regard to whether the inventors were in possession of the subject matter of the asserted claims. Significantly, the Bagby Declaration does not indicate that one skilled in the art would necessarily understand the statement in the Australian application and the teaching to use OFDM as a solution to multipath to mean that the inventors were addressing a problem that only occurs at frequencies in excess of 10 GHz.¹⁹

¹⁸ The inventors’ 1992 publication (Exhibit G to the Gardner Declaration) at page 61 explains: “The use of a higher carrier frequency does result in some minor changes in the reflection and transmission properties of office construction materials. The loss in transmission through materials will increase in proportion to the square root of the increase in frequency.” This suggests that the inventors considered that a greater multimode reflection problem would exist at higher frequencies.

¹⁹ Bagby admits that there is nothing inherent in OFDM that makes it usable only in transceivers transmitting at frequencies in excess of 10 GHz. Bagby Deposition of December 6, 2005, at 69.

The patentee's statements in the written description of the Australian application fall far short of those in *Gentry*. *Supra*, at n.17. The court in *Gentry* concluded that the inventor had clearly expressed in the written description that he considered his invention to be limited to the specific location of the controls on the console on the sofa ("the only possible location") and that any variation was "outside the stated purpose of the invention." *Gentry Gallery*, 134 F.3d at 1479.

As to invalidity, the Bagby Report includes a discussion of the propagation of radio signals and the effect of multipath. The Bagby Report explains that the impact on a radio signal that is reflected off a barrier is dependent on the radio frequency used. However, there is no indication that multipath is restricted to any particular portion of the radio frequency spectrum. *See* Bagby Report at 5. In support of its validity contentions, CSIRO submitted the Levesque Report (Docket No.124), which also contains a discussion of the problem of multipath propagation in an indoor environment. The Levesque Report nowhere indicates that multipath is restricted to any particular portion of the radio frequency spectrum. Levesque Report at 9. Based on these reports, there is an inference that multipath occurs throughout the radio frequency spectrum. There is no evidence to the contrary. Moreover, a reasonable inference can be drawn that those skilled in the art would read the Australian application knowing that multipath occurs throughout the radio frequency spectrum to different extents.²⁰

In order for a claim to be invalid under §112, first paragraph, the disclosure must contain a clear statement to one skilled in the art that restricts the scope of the invention. *Johnson Worldwide*

²⁰ A frequency in excess of 10 GHz can be considered as only one species of frequency within the genus of the radio frequency spectrum that spans 3 KHz to 300 GHz. There was no requirement for the inventors to disclose operation of their invention in all portions (species) of the radio frequency spectrum. *See, e.g., Utter v. Hiraga*, 845 F. 2d 993 (Fed. Cir. 1998). Further, this situation is in contrast to *Tronzo v. Biomet, Inc.*, 156 F.3d 1154 (Fed. Cir. 1998), where the court held that a claim limitation that read broadly on various shapes was not supported because the specification asserted advantages of the conical shape over prior art shapes.

Assoc., Inc. v. Zebco Corp., 175 F.3d 985, 993 (Fed. Cir. 1999). Buffalo has not shown that the statement in the Australian application makes a clear statement that the structure of the disclosed WLAN OFDM-based transceivers was restricted to only frequencies in excess of 10 GHz and did not extend to operation at frequencies less than 10 GHz.

Buffalo cites to the prosecution history where, in the 1995 Amendment, a statement was made that the cited prior references of Smith and Schuchman did not operate at frequencies in excess of 10 GHz. *See* Buffalo Br. at 1, n.1. As CSIRO points out, the prior art was distinguished on three separate grounds. Also, there were claims pending that contained the in excess of 10 GHz limitation. CSIRO Opposition Br. at 27-28. Buffalo nowhere explains why this portion of the prosecution history is important to a determination as to the adequacy of the written description under § 112, first paragraph.

In support of its cross-motion, CSIRO submitted with its opposition brief the Andrews Declaration. Andrews testifies that the box 32 in Fig. 6 contains the baseband processing (i.e., FEC, interleaving and IFFT-based modulator), box 34 contains an intermediate frequency (IF) stage, and box 35 contains the final output stage producing the transmission carrier at a frequency of 60 GHz. Andrews Declaration at ¶8. Buffalo submitted with its reply brief a rebuttal Bagby Declaration. Bagby does not dispute Andrews' characterization of boxes 32, 34 and 36. *See* Bagby Declaration at ¶6. Andrews also testifies that the baseband processing of box 32 shown in more detail in Fig. 7 of the '069 patent is the central focus of the claimed invention. Andrews Declaration at ¶9. The Bagby Declaration does not dispute that point. Bagby Declaration at ¶7.²¹ Such focus, of course,

²¹ This corresponds to the '069 patent disclosure at col. 7:66-8:26, wherein the OFDM, FEC and interleaving are highlighted as the techniques used to "provide a high speed bit transmission rate in the hostile radio environment described above."

necessarily excludes the upconversion of the IF stage 34 and the carrier output stage 35. Andrews further states that “the choice of carrier frequencies is arbitrary from a technical point of view.” Andrews Declaration at ¶9. Although Bagby disputes other aspects of paragraph 9 of the Andrews Declaration, Bagby does not dispute that the choice of carrier frequencies is arbitrary from a technical point of view.

There is no showing by Buffalo as to why one skilled in the art would not read the Australian application with an understanding that multipath occurs at all radio frequencies, that FCC regulations place a limit on what portion of the spectrum could be used (i.e., available bandwidth) depending upon the desired data rate, that absorption and reflectivity of radio frequency signals is dependent upon frequency, that use of the disclosed baseband processing (FEC, interleaving and OFDM) is not constrained to a particular transmission carrier frequency, and that the particular choice of carrier frequency is arbitrary. The inference is that one skilled in the art when reading the content of the Australian application would necessarily have all these things in mind. Then, in so reading the Australian application, one skilled in the art would understand that the inventors were in possession of a WLAN OFDM-based transceiver transmitting with a carrier at any frequency within the radio frequency spectrum.

CSIRO has demonstrated that there is no genuine issue of material fact to preclude summary judgment on the issue of the validity of the asserted claims (10-16, 26-32, 42-48, 56-60 and 68-72) under §112, first paragraph. Further, Buffalo has failed to demonstrate by clear and convincing evidence that the written description of the Australian application could not or does not reasonably convey to one skilled in the art that the inventors were in possession of the claimed subject matter

of the asserted claims.²² Buffalo's evidence essentially reduces to just the fact that the Australian application does not *expressly* state that data transmission can be at any radio frequency in the 3 KHz to 300 GHz range. However, the applicants for the '069 patent were not required to describe exactly the subject matter of the asserted claims; the description needed only to allow persons skilled in the art to recognize that they had invented what is claimed in the asserted claims. *Pandrol USA, LP v. Airboss Ry. Prods., Inc.*, 424 F.3d 1161, 1165 (Fed. Cir. 2005).

INFRINGEMENT

CSIRO has moved for partial summary judgment that the accused Buffalo products directly and literally infringe claims 42-48, 56-60, and 68-72 of the '069 patent. CSIRO has the burden to prove infringement by a preponderance of the evidence. *Cross Med. Prods., Inc. v. Medtronic Sofamor Danek, Inc.*, 424 F.3d 1293, 1310 (Fed. Cir. 2005). The accused Buffalo products include mobile products, hub products, and other products.²³ The structure of these products is detailed in the Expert Report of Thomas Conte.²⁴ The parties agree that there is no dispute as to the structure of the accused products. *See* Buffalo Response Br. at 2. The dispute between the parties is with respect to two limitations: means to apply a data reliability enhancement and means . . . for interleaving blocks of said data. There is a third dispute as to the proper construction of the term "blocks" in the function specified as "interleaving blocks of said data." *See* Buffalo Response Br. at 2.

²² It necessarily follows that Buffalo has failed to overcome the presumption that no new matter was added by the 1995 Amendment. *See Brooktree Corp. v. Advanced Micro Devices, Inc.*, 977 F.2d 1555 (Fed. Cir. 1992).

²³ These accused products are identified by product number at pages 2-3 of CSIRO's brief in support of its motion for summary judgment.

²⁴ With one exception the accused Buffalo products use a baseband processor chip (integrated circuit) manufactured by Broadcom Corporation. The other product uses a Ralink baseband processor. There is no dispute that each processor implements the relevant portions of the IEEE 802.g standard for WLAN.

Applicable Law

It is standard doctrine that determining infringement is a two-step process. *Tex. Instruments Inc. v. Cypress Semiconductor Corp.*, 90 F.3d 1558, 1563 (Fed. Cir. 1996). First, a court must construe the asserted claims as a matter of law to ascertain their meaning and scope. *Id.* Second, the claims as construed are compared to the allegedly infringing device. *Id.* To infringe a claim, each claim limitation must be present in the accused product. *Id.*; *Sofamor Danek Group, Inc. v. DePuy-Motech, Inc.*, 74 F.3d 1216, 1220 (Fed. Cir. 1996).

The Court has construed “means to apply data reliability enhancement” as “the Rate $\frac{1}{2}$ TCM (trellis coded modulation) Encoder described in block 42 of Figure 7 and referenced at column 6:32-46.” Hereinafter, this will be referred to as the “DRE means.”

The Court has construed “means . . . for interleaving blocks of said data” (interleaving means”) as “the Di-Bit Interleaver described in block 43 of Figure 7.”

Literal infringement of a §112, ¶6, limitation requires that the relevant structure in the accused device perform the identical function recited in the claim and be either identical to or equivalent to the corresponding structure in the specification. *See, e.g., Al-Site Corp. v. VSI Int'l, Inc.*, 174 F.3d 1308, 1320 (Fed. Cir. 1999); *Pennwalt Corp. v. Durand-Wayland, Inc.*, 833 F.2d 931, 934 (Fed. Cir. 1987) (en banc) (overruled on other grounds). Functional identity and either structural identity or equivalence are both necessary. *See Pennwalt*, 833 F.3d at 934.

The test for structural equivalence under §112, ¶6 is closely related to the test under the doctrine of equivalents, involving “similar analyses of insubstantiality of the differences.” *Al-Site*, 174 F.3d at 1321. In the doctrine of equivalents context, the test for equivalency often used is whether the “function, way, and result” of the substituted structure is substantially different from that

described by the claim limitation. *Warner-Jenkinson Co. v. Hilton Davis Chem. Co.*, 520 U.S. 17, 29, 40 (1997). If so, equivalence is not established. *Id.* However, under §112, ¶6 the “way” and “result” at issue—whether the “way” the structure of the accused device performs the claimed function and the “result” of that performance—are insubstantially different from the “way” the claimed function is performed by the corresponding structure described in the specification and the result of that performance. *Odetics, Inc. v. Storage Tech. Corp.*, 185 F.3d 1259, 1267 (Fed. Cir. 1999). Thus, if the structure performs the claimed function in substantially the same way to achieve substantially the same result as the corresponding structure described in the specification, there is equivalence and literal infringement. *Id.* This test for equivalence, however, does not involve a component-by-component comparison of the two structures. *Id.* at 1267-68.

Analysis

“Means to apply data reliability enhancement”

It is undisputed that the accused Buffalo products perform an identical function to the “means to apply data reliability enhancement.” It is also undisputed that the function is performed in the accused Buffalo products by a convolutional encoder. The dispute is whether the convolutional encoder is the same as, or a structural equivalent to, “the Rate $\frac{1}{2}$ TCM (trellis coded modulation) Encoder described in block 42 of Figure 7 and referenced at column 6:32-46.”

As evidence that Buffalo’s products literally infringe, CSIRO submits the Monsen Declaration (Docket No. 130). Monsen gives the opinion that the accused Buffalo products literally infringe because the accused Buffalo products have an equivalent structure performing the specified function of the DRE means structure. In support, Monsen states that a TCM encoder is a form of convolutional encoder. Monsen also states that the way the TCM encoder of block 42 performs the

function of applying data reliability enhancement is to add redundancy with a delay line and that the result is that the output bit rate is larger than the input bit rate. Monsen Declaration at 14-15.

In opposition, Buffalo relies upon the Lanning Declaration. The Lanning Declaration states that “TCM” stands for trellis coded modulation. Lanning shows the structure for TCM and states that a combination of coding and modulation is involved in TCM. Lanning Declaration at 5-6, ¶¶ 11-12. The structure of the coding portion of TCM is identified as a convolutional encoder. The additional structure provides signal mapping to the output of the convolutional encoder. In Lanning’s opinion, the accused Buffalo products do not have an equivalent DRE means because block 42 includes of both coding and modulation (mapping), whereas the Buffalo products use only coding without signal mapping. Lanning Dec. at ¶¶ 9, 17, 20.

To reach his opinion, Lanning compares combined structures of a convolutional encoder and a signal mapping device to a structure with just a convolutional encoder. The difference identified is, of course, the signal mapping device. Based on that difference, Lanning points out that the TCM Encoder converts a stream of data to a constellation map, whereas the convolutional encoder standing alone only adds additional bits to the stream of data. Lanning then states, “The two structures perform different functions” Lanning Declaration at ¶ 20. But, Buffalo does not dispute that the accused Buffalo products perform the identical function of the claimed DRE means. See Buffalo’s Response to Plaintiff’s Statement of Undisputed Facts at p. 5, ¶ 18, and at p. 9, ¶ 35.

Lanning improperly bases his opinion as to the lack of equivalency on a component-by-component comparison and not the overall structure corresponding to the claimed function.²⁵ While

²⁵ The individual components of an overall structure that corresponds to the claimed function are not claim limitations. Thus, structures having different numbers of parts can be equivalent under § 112, ¶ 6. See, e.g., *Al-Site*, 174 F.3d at 1321-22.

Lanning gives the opinion that there are substantial differences between the TCM Encoder 42 and the convolutional encoder in the Buffalo products, the only difference Lanning points to is the addition of the mapping function for modulation. Absent is any discussion as to why that difference is substantial in the way the function of applying data reliability enhancement is performed or the result that is obtained.

The diagram of Fig. 2 in paragraph 11 of the Lanning Declaration is evidence that the “encoder” used in TCM is, in fact, a convolutional encoder. A TCM Encoder is a “type” of convolutional encoder; it just also adds a mapping function to the stream of data after additional bits for redundancy have already been added. There is nothing in the Lanning Declaration that even suggests that the redundancy of the added bits introduced by the convolutional encoder is in any way removed by the downstream mapping function.²⁶

Moreover, Lanning does not dispute Monsen’s opinion that the way the function of data reliability enhancement is performed by block 42 is by adding redundancy bits by a delay line and that the result obtained is having a larger output bit rate than the input bit rate. Thus, there is no dispute that the claimed function is being performed in substantially the same way by a convolutional encoder standing alone (adding redundancy bits) or that the result obtained by a convolutional encoder standing alone (larger output bit rate than the input bit rate) is not substantially the same. All Lanning points to is the addition of a signal mapping device that makes the output from a TCM Encoder a stream of coordinate bit pairs, which necessarily has redundancy added to it by the upstream convolutional encoder.

²⁶ Buffalo submitted Exhibit # 791 from the Levesque deposition. At page 300, there is a statement that the advantage of TCM over traditional error-correction coding schemes “is in its ability to achieve improved power efficiency without the customary bandwidth expansion introduced by the use of coding.” At page 301, there is the statement that TCM is used to “create redundancy.” This is consistent with the ‘069 patent at col. 9:66-10: 2.

CSIRO has demonstrated that there is no genuine issue as to the existence of the DRE means in the accused Buffalo products. Further, by a preponderance of the evidence, the accused Buffalo products include the same or an equivalent structure as the “the Rate $\frac{1}{2}$ TCM (trellis coded modulation) Encoder described in block 42 of Figure 7 and referenced at column 6:32-46.”

“Blocks”

As to the “means . . . for interleaving blocks of said data,” the parties dispute whether the identical function is performed in the accused Buffalo products. There is no dispute that the accused Buffalo products use bit-by-bit interleaving. Rather, the dispute is one of claim construction as to whether the term “blocks” means that a block of data can have one or more bits or that a block of data must have multiple bits.

CSIRO argues that a block can have one or more bits. In support, CSIRO points to the ‘069 specification as disclosing both a QPSK (Quadrature Phase Shift Keying) embodiment (Fig. 7) and a BPSK (Binary Phase Shift Keying) “embodiment.” *See* col. 9:29-34.²⁷ CSIRO also points out that the dependent claims (e.g., claim 14) specifies BPSK. The significance is that a QPSK symbol has multiple bits to be processed but a BPSK symbol has only a single bit. Thus, the ‘069 patent discloses that the interleaving function could involve either a single bit or multiple bits.

Buffalo argues that a block must have multiple bits because the Court’s claim construction identified the corresponding structure as the Di-Bit Interleaver described in block 43 of Figure 7. Buffalo’s argument turns claim construction of a means-plus-function limitation on its head. The term “blocks” is within the language that specifies the function being performed by the means. At

²⁷ The discussion of the BPSK “embodiment” addresses only functional operation and does not provide a description of corresponding structure for a BPSK implementation. This is sufficient for construction of the recitation of the function specified in the means-plus-function limitation.

the threshold stage of construing the language setting forth the specified function, there is no consideration of the corresponding structure. The corresponding structure disclosed in the specification is only evaluated after the function has been construed. Buffalo's construction of "blocks" begins with a structure to construe the function. To adopt Buffalo's position would result in impermissibly reading limitations of the preferred embodiment into the claim limitation, thereby narrowing the specified function.

The Court construes "blocks" to mean "a block of data having one or more bits."

"Means for interleaving blocks of data"

The Court defined the function of this means-plus-function term as "interleaving blocks of data." The Court identified "the Di-Bit Interleaver described in block 43 of Figure 7" as the corresponding structure. Buffalo contends its interleaver only interleaves single bits, not di-bits. Thus, as with "means for applying data reliability enhancement," the Court must determine whether the "way" Buffalo's interleaver performs the claimed function and the "result" of that performance are insubstantially different from the "way" the corresponding structure performs the function and the "result" of that performance.

Given the construction of "blocks," there is no dispute that the accused Buffalo products perform an identical function of interleaving blocks of data. There also is no dispute that the accused Buffalo products do not have a di-bit interleaver. Thus, CSIRO must demonstrate that the bit-by-bit interleaver in the accused Buffalo products is only insubstantially different from the di-bit interleaver described in block 43 of Figure 7.

The Monsen Declaration submitted by CSIRO gives an opinion that a bit-by-bit interleaver is insubstantially different from a di-bit interleaver. Monsen explains that the size of the blocks to

be handled by an interleaver is a parameter that depends on the modulation format, data reliability enhancement technique, and channel conditions. Monsen Declaration at 16. In either case, a reordering algorithm (way) is used so that the output block pattern is different than the input block pattern (result). Thus, according to Monsen, interleavers that handle different block sizes are insubstantially different. Monsen Declaration at 15.

The Lanning Declaration submitted by Buffalo agrees that the way the di-bit interleaver performs the specified function is by “shuffling” the di-bit blocks with the other di-bit blocks. Lanning Declaration at 9-10. Also, Lanning does not disagree that the result is an output block pattern that is different than the input block pattern. The basis for Lanning’s opinion that the bit-by-bit interleaver is substantially different from the di-bit interleaver is that the latter operates on “married” di-bits. Lanning Declaration at 9-13. In reaching that opinion, Lanning considers not just the di-bit interleaver but combines with it the operation of the Rate $\frac{1}{2}$ TCM Encoder and the QPSK Encoder as to the input data structure to the di-bit interleaver and as to the output data structure from it. From that point of view, the only distinction that Lanning identifies is the unremarkable observation that with the single bit interleaver each bit remains as an individual bit and is not grouped together in pairs. Lanning Declaration at 11. Other than the different configuration of the data structure that is input to and output from a di-bit interleaver from that of single bit interleaver, Lanning does not indicate any difference in the way each of the interleavers performs the interleaving function or as to the result obtained by them. Once again, Lanning is applying an approach akin to a component-by-component comparison of the two interleavers, which is improper.

CSIRO has demonstrated that there is no genuine issue as to the structural equivalence of the bit-by-bit interleaver in the accused Buffalo products and the Di-Bit Interleaver described in block

43 of Figure 7. Further, by a preponderance of the evidence, the accused Buffalo products include an equivalent structure to the Di-Bit Interleaver described in block 43 of Figure 7.

CONCLUSION

For the foregoing reasons, the asserted claims of the '069 Patent are not invalid as anticipated or obvious. Further, the asserted claims are not invalid for lack of support in the written specification. Finally, Buffalo infringes the asserted claims.

So ORDERED and SIGNED this 13th day of November, 2006.

A handwritten signature in black ink, appearing to read 'Leonard Davis', written over a horizontal line.

**LEONARD DAVIS
UNITED STATES DISTRICT JUDGE**